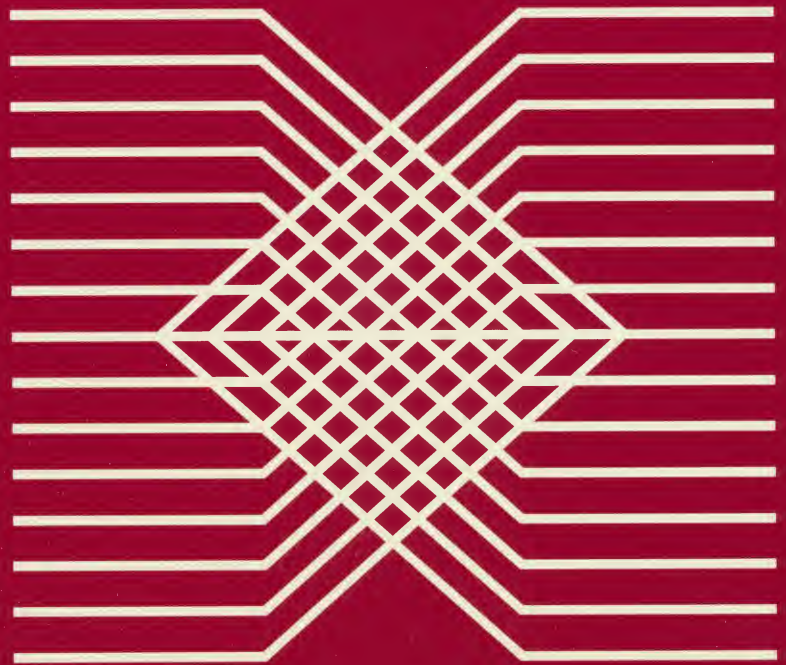


time-sharing

BUSINESS PROCESSOR GUIDE
CONTROL DATA® 3300/3500





BUSINESS PROCESSOR GUIDE

FOR BUSINESS DATA PROCESSING: A NEW HIGH-SPEED SYSTEM

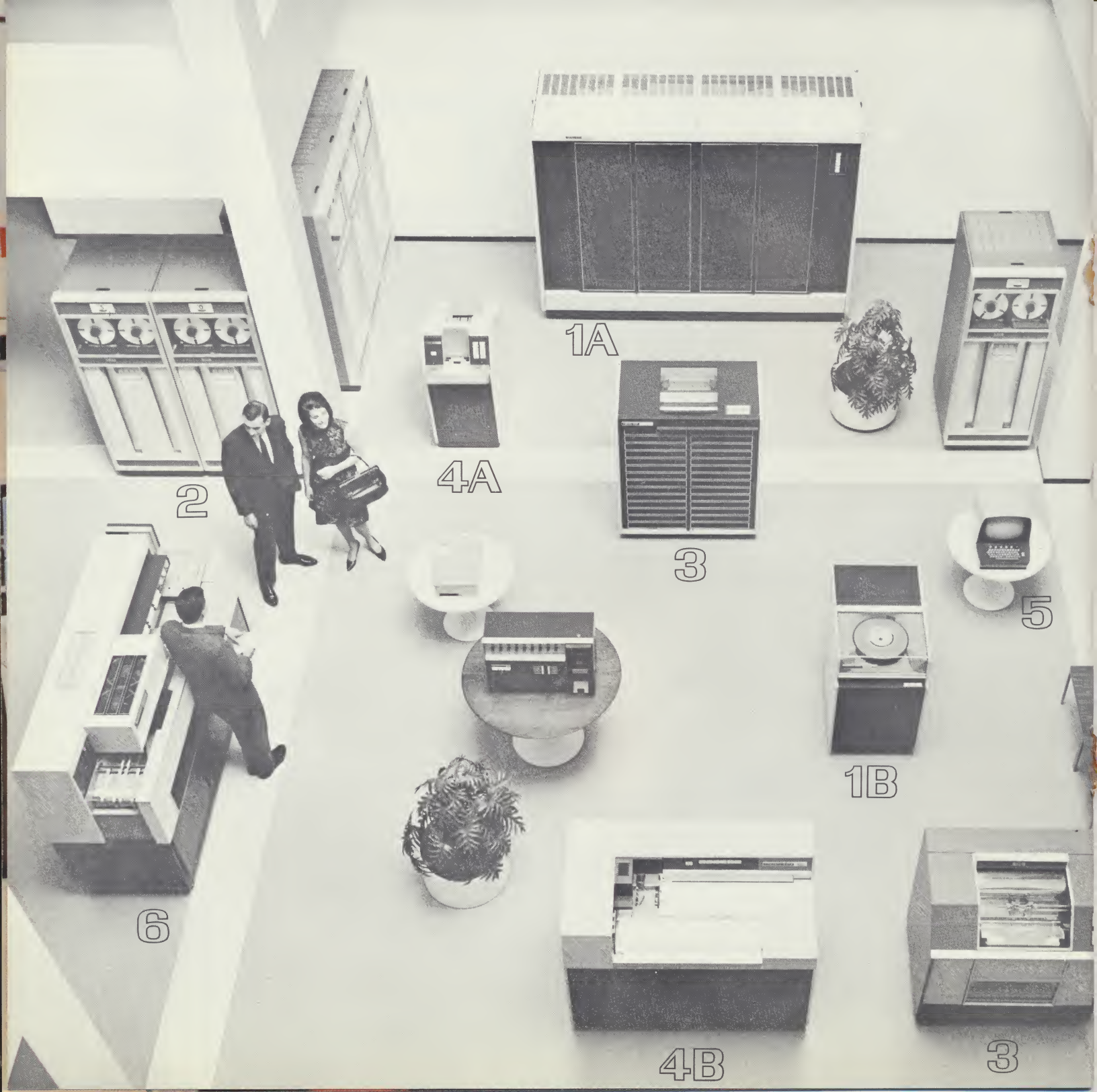
A new high-speed Business Data Processor has been added to the CONTROL DATA® 3300 and 3500 Time-Sharing Computer Systems for those who require extra capability for large volume business processing.

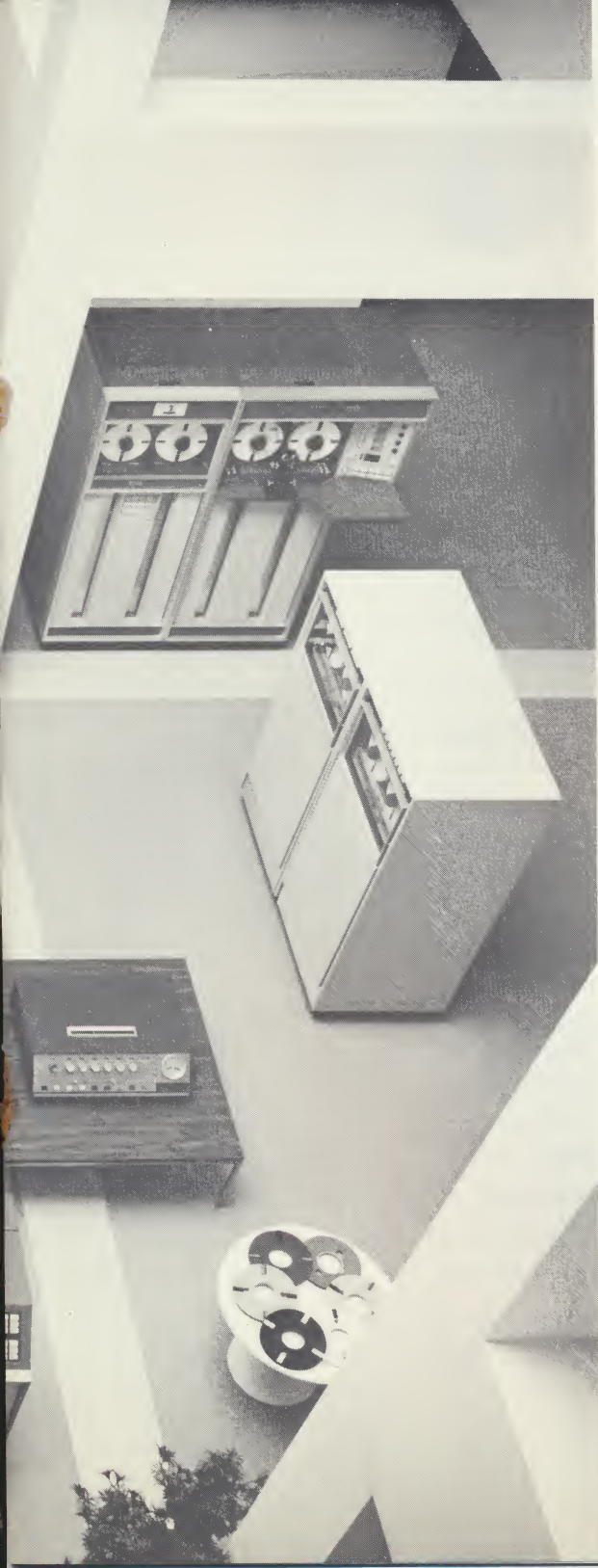
No longer is it necessary to rely solely on a software-oriented system. Now, the best of the two worlds—high-speed hardware and efficient software—combine to accelerate solution of problems in accounting and finance, production control and sales management, billing and inventory control, and all the other information lifelines that contribute to total business management efficiency.

"WIRED-IN" FOR FAST RESPONSE

The CONTROL DATA Business Data Processor employs a new circuit design in its hardware called INTEBRID™. This high density diode transistor logic package, developed by Control Data, is fully compatible with the general hardware in the 3000 Series Time-Sharing systems. But for business data processing problems, the design increases speed dramatically over common high-speed hardware.

The instructions significant to business data processing are "wired-in" to the computer and executed through high-speed hardware for a significant speed increase in computation and, therefore, user response over purely software execution. In fact, the design of these hardware instructions has been dictated by the software operations most commonly required by business programmers and most often used in COBOL programs.





COMPLETE TIME-SHARING PERIPHERALS

The 3300/3500 Time-Sharing Systems already exceed current peripheral requirements for multiple users with a wide variety of advanced devices for input and output and mass storage.

With multiple high- and low-speed channels standard in both systems, the user can tailor his system to satisfy both local and remote inquiry requirements.

The peripheral equipment you see on these pages is available for either the 3300 or the 3500 System.

1. MASS STORAGE DEVICES

A. Disk Files: Capacity is up to 201,306,592 six-bit characters per file with a transfer rate of 196,600 characters per second and a 65 millisecond average access time.

B. Disk Storage Drives: Compact, removable disk packs provide a capacity of up to 8,192,000 six-bit characters with transfer rates of up to 208,333 characters per second and an 85 millisecond average access time.

Drum Storage (not illustrated): Magnetic drum storage contains 4,194,304 characters of storage. Average access time is 17 milliseconds with up to 2 million character per second transfer rate. Drum storage is accessible in 12-bit bytes.

2. MAGNETIC TAPE TRANSPORTS

Control Data offers a wide choice of magnetic tape transports. A wide choice of speeds and capacities is available with 37.5, 75 and 150 inches per second and 200, 556 and 800 bits per inch. Models 604 and 607 allow Read forward and reverse. All systems are pneumatically controlled.

3. LINE PRINTERS

A full line of low-, medium- and high-speed line printers is available for the 3300 and 3500 Time-Sharing Systems. Speeds range from 150, 300, 500, 600, 1000 and 1100 lines per minute with 64 characters and 120 or 136 columns. Printers are available for either single or dual channel operation.

4. PUNCHED CARD SYSTEMS

A. Card Punch: The 415 can handle up to 250 80-column cards per minute. A post-punch read station is included to facilitate complete card checking.

B. Card Readers: The 405 reads punched cards photoelectrically at speeds of 1200

cpm (80-column) and 1600 cpm (51-column). Optional features allow either columnar data or Hollerith data (converted to BCD) to be read. Also available is the low-speed 3142 Card Reader, which reads at a rate of 100 cpm.

5. REMOTE INQUIRY AND RETRIEVAL STATIONS

For fast time-shared access to the 3300 and 3500 Systems, Control Data offers a series of single station and remote station entry and display systems. These include the CONTROL DATA 210 keyboard and CRT display with 20 lines of 50 characters from a 64-character repertoire on a 6 X 8-inch display screen. Controllers provide a 1K buffer and character generator. Acoustic couplers are also available to provide standard telephone communication links for special remote devices.

Teletypewriter terminal units are available for connection between communications terminal controllers and 60, 75, or 100 word-per-minute simplex or duplex Teletype lines.

6. 915 PAGE READER

Permits direct conversion of typewritten or printed form information into computer language by optical electronic methods. Reads all letters of the alphabet, numerics 0 through 9, standard punctuation and special symbols for programmed functions. Handles documents from 4 to 12 inches in width and 2½ to 14 inches in length plus continuous length fanfold sheets.

PAPER TAPE STATIONS

Paper tape reader-punch systems include a 350 character-per-second reader and 120 character-per-second punch for operation from one standard channel. For two-channel operation, a 1000 character-per-second reader with 120 character-per-second punch is available.

INCREMENTAL PLOTTERS

Handle a wide variety of engineering and curve plot operations from 11 inches in width to 30 inches in width. Operate at 300 steps per second from one standard channel. Precision at .01 inch per step.

Also available for the 3300 and 3500 Time-Sharing Systems are high-speed digital communications terminals and controllers for remote access stations plus special devices including hybrid linkages and real-time controls. Detailed descriptions of all peripheral devices for the 3300 and 3500 are available through your nearest Control Data representative.

MEMORY-TO-MEMORY SPEED

One of many reasons for the fast and highly efficient power of the Business Data Processor is that it operates on a simple two-address scheme, corresponding to the processing requirements of a large share of business data. This eliminates the steps required in preparing registers before operations begin, and in storing results after computation. "Memory-to-memory" logic results in the greatest efficiency, increasing throughput of the system.

POWERFUL INSTRUCTIONS

With significant business processing instructions "wired-in", the business problem time-sharer starts with a speed bonus. These instructions in the Business Data Processor fall into three logical categories:

☐ Conversion of format

For extremely fast format conversion such as ASCII to BCD or BCD to binary, the Business Data Processor permits data to be handled in optimum form without paying the usual conversion penalty.

☐ BCD Arithmetic

Arithmetic operations need no format conversion between input and output by being performed with six-bit BCD characters comprising variable length fields. The language of the input/output units is the language of the processor.

☐ SEARCH, MOVE, COMPARE, EDIT

All four are common and often-used operations in business data processing and are included in high-speed hardware. Significant hardware compatibility with COBOL specifications has been achieved.

The speed bonus is evident not only because these often-used operations are now in high-speed hardware but also because they now eliminate many set-up steps formerly necessary, thus compacting the business program.

Some of the advantages inherent in the instructions in each category are listed below.

FORMAT CONVERSION

- ☐ Converts up to a 14-character BCD number into its binary equivalent in one execution.
- ☐ Up to 47 binary bits plus sign can be converted into its BCD equivalent in one execution.
- ☐ TRANSLATE instructions translate up to 4096 six-bit BCD characters into 8-bit ASCII code, or 8-bit ASCII code into 6-bit BCD.

SEARCH

- ☐ Searches up to 4096 six-bit characters in one execution.
- ☐ Indexing by either of two index registers.
- ☐ Searching from right to left or left to right for significant time-saving.

MOVE

- ☐ Hardware move of up to 4096 six-bit characters for highly efficient data block transfers.
- ☐ Blank fill of character positions unoccupied by data may be specified as an option in the instruction.
- ☐ Zero fill may be optionally specified for numeric fields.

EDIT

- ☐ Either hardware insertion of commas and decimal place, or a formatted insertion of a full character set as defined in COBOL specification.

ARITHMETIC INSTRUCTIONS

- ☐ Two address arithmetic eliminates loading of accumulator register prior to operation.
- ☐ Core-to-core processing speeds up execution.
- ☐ Arithmetic performed on six-bit characters, eliminating need to pack into 4-bit characters prior to operation.
- ☐ Completely variable length fields are processed with automatic sign control.

PROGRAMMING FOR FAST RESPONSE

The Business Data Processor in a CONTROL DATA 3300 or 3500 Time-Sharing system gives a significant increase in system speed for solution of business problems. This is due to the mating of high-speed hardware instructions with complete business-oriented software packages.

Other bulletins in this series on time-sharing the 3300 and 3500 systems describe fully the basic software, much of which is already in operation—REAL-TIME SCOPE, DISK SCOPE and MASTER operating systems, as well as the various maintenance and system library packages. But of particular interest to the business user is the MASS STORAGE INPUT/OUTPUT system (MSIO) with potential file management capabilities and the effect it has in reducing programming expenses and maximizing efficiency and reliability in large file processing applications.

MSIO operates within the 3300 and 3500 Time-Sharing Operating Systems — Real-Time SCOPE and MASTER — performing high-speed I/O operations on mass storage devices and standard peripheral devices.

Some of its more interesting features are:

- ☐ allocate and protect permanent files.
- ☐ increase and decrease file allocation.
- ☐ generate and process equipment labels and file labels.
- ☐ initialize and terminate file processing.
- ☐ provide sequential, sequential-with-linkage, or random file processing.
- ☐ read and write file records from internal program requests.
- ☐ process variable and fixed-length record blocks and logical records on mass storage.
- ☐ inform user of his file status, furnishing

both hardware and logical condition indicators.

- ☐ LOOK and SEARCH scans of logical records in a file through internal program requests.
- ☐ add, delete and replace logical records with the file linkage processing feature.
- ☐ provide a set of utility routines to load, reorder and reallocate files.

Operating in conjunction with MSIO, the 3300 and 3500 systems provide a central "banking facility" for all the data that may accrue in a particular center—any corporation, agency or institution time-sharing a 3300 or 3500.

File management capabilities organize data into program or data files for swift and convenient file handling. A common language is accessible to all users including those who operate from remote consoles such as the CONTROL DATA 210 keyboard display systems or teletypewriters.

The user simply enters his data or programs directly into files on high-performance drums or disks, or on Control Data's new disk packs or magnetic tape units. If he wishes to retrieve information, he requests the system to issue his data in source or report form. Any user can also submit requests for job executions through this simple, high-speed system.

Another convenient and quick feature is that programs running under the system are allowed direct access to file handling subroutines through direct calls rather than through the language processor.

MSIO with file management capabilities is available for 3300 and 3500 Time-Sharing Systems with or without the optional Business Data Processor. For some 3300 and 3500 users, this option will provide for easy system growth in the future.

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